IT Law in the Framework of Legal Informatics

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1   Introduction

IT law can be approached in different ways. The traditionalist sees a collection of more or less fragmented legal issues having to do with 'computers'. The cyber radical sees a new electronic world where classic legal concepts and models of reasoning no longer apply. A placeless world, a virtual world of speedy bits where law as we have known it has ceased to make sense. The clashes between these two opposite approaches tend to lay open not so much the strength and soundness of one view or the other but rather the common lack of understanding of the relationships between law on the one hand and IT on the other. This paper will focus on these relationships. It will attempt to clarify why IT law forms a natural part of legal informatics and how the theoretical framework of legal informatics aids in understanding IT law both in a general sense and with regard to specific issues. The main message of the article can be summarised in the proposition that the main challenge of IT law has to do with improving our understanding of *how rules interact with tools*.

The discussion that follows will begin with an attempt to describe what legal informatics stands for and how it is being developed in academia. It must be underlined that the description is compact and that it could easily have been expanded in various directions. Here, the direction chosen has to do with a core issue of legal informatics, viz. how the relationships between legal regulation and technical tools ought to be dealt with. The main message is that they are closely interlinked and that the links between the two put their mark on legal informatics as a whole and serve to characterize the field.

Based on this assumption, some elements of a general methodology of legal informatics will be presented. The idea is to outline parts of a general framework for the study of IT law and to illustrate how such a framework can be helpful.

The often discussed question of whether law can cope with the rapid development of IT and its uses in society will be devoted a few comments before attention is turned to different approaches to issues of IT law – from the traditional that rely on established categories of legal scholarship to the more daring that involve attempts at legal informatics theory building.

The paper ends with a few comments on the usefulness of developing IT law as an integrated part of legal informatics rather than as a fragmented study of isolated issues without a common framework.

2   Legal Informatics in a Nutshell

Legal informatics is a relatively young and not very well known discipline. A few words are in place to describe its main characteristics.

Legal informatics is a branch of legal science. This means that problems are defined and dealt with according to criteria, which the legal community consider relevant and comprehensible. But legal informatics strives to go beyond traditional, text-oriented analyses of valid law (normative or 'dogmatic' legal science). Thus, legal informatics is *interdisciplinary* and strives to complement the traditional legal perspective with perspectives from the field of informatics.

The definitions of informatics vary and often the term *information sciences* is used as a synonym. In short, informatics encompasses many fields where information plays a central role; system theory, computer science, communication theory, information security theory, cognitive science, and library science, to mention a few.

There are two common ways of labelling fields where law finds itself in company with other branches of science, viz. '*law and x*' and '*legal x*'. Consider, for example 'law and economics' and 'legal philosophy'. It may be asked whether there is a difference between the two formulas in the sense that the 'law and x' formula signifies a weak relationship between law and its 'partner', whereas 'legal x' stands for a closer relationship with an emphasis on law as the host discipline. Briefly, does the 'legal x' formula mark a more advanced form of interdisciplinarity?

The history of legal informatics shows traces of such a view. At the outset, focus tended to be on 'law and computers', often understood to comprise only 'computer law', i.e. straightforward matters of substantive law related to automated data processing. 'Legal informatics', on the other hand, is intrinsically associated with higher ambitions and a strive to develop a theoretical platform that extends beyond traditional (dogmatic) legal science.

How, then, does legal informatics relate to the two main fields of 'law and computers', namely the two fields that have always been distinguished in discussions of legal aspects of information technology. One field is 'the legal regulation of computers' (*rules*), the other is 'the legal use of computers' (*tools*).

The first main field – rules – comprises various regulatory matters where information and information processing are in focus, the protection of property rights in digital information, for example. The second main field comprises a variety of sub-fields where information processing is designed and performed for legal purposes or in a legal context. Some examples are judiciary information systems, litigation support systems, and artificial intelligence in law.

Many questions arise as one examines more closely the rules and the tools fields, questions that are partly theoretical and partly practical.

Among other things, it may asked what are the general principles for distinguishing *sub-fields* within the two main fields. According to a conservative or cautious view, pre-existing legal divisions suffice for the rules main field and there is no need for constructing new categories or reorganising legal thinking. Approaches of this kind tend to lead to simple enumeration of IT-related issues placed into well-known slots such as 'contract law', 'intellectual property law' and 'telecommunications law'. However, simple enumeration of this kind raises further questions that indicate deeper concerns.

For example, there is a need to make clear what are the *core* sub-fields and what are the *peripheral* ones. Answers to this question can be looked for in different directions. For example, sub-fields that have tended to be in focus for a long time and have generated much literature may be looked upon as central. The protection of personal data is one such sub-field.

Another possibility is to place sub-fields that require rethinking of legal concepts and rule structures in the foreground. One example is the legal treatment of electronic agents. Such agents represent advanced forms of automation. Agents (basically computer programs) move about on the data

networks and perform all kinds of tasks for which they have been designed and instructed. They can adjust their behaviour to reach pre-set goals, they can operate without direct intervention of human beings, and are able to engage in social activities such as negotiation with other electronic agents or humans. Clearly, there is room for intricate legal thinking and categorising having to do with contracts, liability, power of attorney, legal competence, and so forth.

A third possibility is to emphasise sub-fields that constitute hot topics, i.e. new and often surprising themes that have to be dealt with swiftly if law is not to be regarded as lagging behind. The clash between the traditional fair use exemption in copyright and the use of file sharing and peer-to-peer technology may serve to illustrate. Another current example is the collision between civil rights and the use of data mining to fight international terrorism.

Among the research groups and institutions working in the field of legal informatics today there are many views on matters of centre and periphery. Sometimes this is reflected in their names, and definitely in the kind or research projects undertaken and literature produced. Not least, there is a difference between institutions that have a broad outlook on legal informatics and the ones that take a more selective or narrow view. The latter may, for example, leave out all tool aspects and concentrate on matters of rules and, in doing so, shun all efforts to develop a general 'information law' and stay with traditional legal concepts and divisions. It is not uncommon that the narrow view is outright hostile to the notion of 'legal informatics' and regards the concept as something superfluous or even misleading. One may see this as an example of friction between paradigms in the social sciences.

To conclude, the alternatives and approaches that have been sketched above seem to boil down to *one basic question*: are the two main fields, i.e. the rules and the tools fields, separate or are they interlinked?

3   The Interaction Perspective – Rules and Tools

Two propositions should guide our thinking about the issue of rules and tools:

- We are dealing with *more than simple hardware aspects* of the tools.

- We are dealing with *more than a simple concatenation* of 'law *and* IT'.

The first proposition should – today – be obvious, even trivial. The tool as a physical device certainly is impressive with regard to processing speed, data storage capacity, versatility, etc. But information technology is much more than hardware. It is a complex tool not to be likened to a ruler, a saw or a sextant. The physical equipment is intertwined with mental elements in the same way that the signs of an alphabet are intertwined with human thinking and communication. From this point of view it may be said that it is difficult to determine where the 'hard sides' end and the 'soft sides' begin. Information technology is a tool for mind work just as eyeglasses are a tool for seeing.

The soft sides are certainly present and visible in *computer programs*, the changeable logic that is a key element of the definition of an 'automatic computer'. Program instructions steer the working of the machinery and transform it from dead matter to active performer.

The soft sides of computing continue with *databases* and *application-related knowledge* (document management methods, for example). There are also soft aspects associated with *the information infrastructure* of diverse areas of activity (financial markets, for example) and of whole societies. Examples are industry standards of all kinds and general and special models for the design of information systems.

Often information technology is described in ways which emphasise the soft sides and let the hard sides fade into the background: IT can then be perceived as a *market*, as an *ecology*, as a *community*, as a *commons*, as a *culture*, and so forth.[1]

The second proposition – the one implying that we are dealing with more than a simple concatenation of 'law *and* IT' – is more controversial than the proposition regarding the 'soft side' and not always correctly understood.

The phrase 'Law *and* IT' tends to convey the impression that the two phenomena simply are placed together like 'bus and train' or 'coffee and tea'. This is the basic semantic task of the conjunction 'and'. But the 'and' need not be interpreted in this passive and pale way. It can also indicate logical and/or functional relationships as in 'bread and butter' or 'age and wisdom'. In the case of 'law and IT', there is a need for a 'rich' conjunction, a word that signals not only concatenation but *interactivity*, *mutual dependencies*, and the like. Since it appears to be difficult to find such a word, the nature of the relationship between law and IT has to be expressed in a more elaborate way, perhaps something like this:

Law *intersection* IT

where *intersection* = *f* (rule, tool)

In this way it is signalled that rules and tools constitute a dynamic whole, that rule elements and tool elements are interconnected, and that a deep understanding of law and IT is related to both rule and tool elements. In other words, in order to understand the interplay of law and IT, it is necessary to consider both rule and tool aspects and only a combination of the two can lead to a full understanding.

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[1] Some examples from a rich literature. Rifkin, Jeremy, *The Age of Access. How the Shift from Ownership to Access is Transforming Capitalism*, Penguin Books, London 2000. Nardie, Bonnie A., O'Day, Vicki L., *Information Ecologies. Using Technology with Heart*, The MIT Press, Cambridge/London 1999. Rheingold, Howard, *The Virtual Community. Homesteading on the Electronic Frontier,* New York,… Addison-Wesley 1993. *Culture, Technology, Communication: Towards an Intercultural Global Village.* Ed. Ess, Charles with Sudweeks, Fay, State University of New York Press, Albany 2001.

The consequences of taking such a view are many. The basic one is, of course, that it is seen as *a key task of legal informatics to study systematically the interaction of law and IT* and to develop an understanding that has both practical and theoretical facets. Practical facets meet in the context of lawmaking, for example, where the development of regulation of IT and its applications frequently requires a good grasp of the technology. Theoretical facets have to do with, among other things, how automation of information processing affects legal thinking about various key concepts associated with human activities; 'good faith', 'negligence', and 'intention', just to mention a few.

The need for an understanding of the interaction of law and IT is not limited to isolated phenomena (such as the technical and logical build-up of the internet). It also encompasses *the general characteristics of information technology* as a totality of machinery, logic, applications, activities, organisation etc. In many contexts it is useful to distinguish the main elements of such a broad description. One way of doing so is to sort them into the categories automation, information, communication, integration, penetration, and sensation.[2]

Automation is the basic and oldest element, the element that defined the new technology of electronic computing. Automation means doing away with slow manual action. Even early forerunners of today's computers could perform mathematical operations at the speed of 5 to 10 per second. From the legal point of view, automation of this kind did not pass unnoticed. For one thing, computer programs needed to be placed into the framework of intellectual property law. And automated decision making in public administration early on caused concern from the point of view of both legality and jurisprudential theory.

At the outset the *information element* was a only a minor concern. The volumes of input and output data were mere trickles compared with what we have later become used to. When mass data storage became technically and economically feasible, the new technology began to be perceived as *the* instrument for storing and using large volumes of data. Computer systems found uses in many new contexts where automated processing could be combined with comprehensive filing systems and databases. In consequence, new legal interests arose having to do with, for example, computerised processing of personal data and the building of systems for the storage and retrieval of legal texts.

Communication via local and global networks has been a reality for decades. But it was not until the internet revolution of the 1990s that communication began to be perceived as an essential element on a par with, and perhaps even surpassing, the automation and information elements in terms of importance. This development is reflected in the increasingly frequent use of the term ICT instead of the older IT.[3] It should be underlined that communication has to do not only with communication between machines but also with communication between people. Thus, IT has become a medium both for private communication

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[2]   The overview is a slightly revised version of a part of Seipel, Peter *The Changing Faces of Legal Informatics* in Festschrift für Wolfgang Kilian, Nomos, Baden-Baden 2004, p. 137-139.

[3]   In this paper I stick to the term IT. It should, of course, be read so as to include communication technology.

(e-mail, chat) and for mass communication (spam, streaming audio). This development is reflected in the legal discussion. It has moved from relatively straightforward issues of traditional telecommunications regulation involving "conduit" to issues of "content" having to do with such themes as free speech, crime in cyberspace, and different strategies for the governance of global data networks.

Integration has to do with phenomena of convergence of different kinds. Perhaps the most well known is the convergence or the melting together of telecommunications, mass communication media, and data processing. These fields have traditionally been regarded as separate areas of legal regulation and their coming together has required (and still requires) changes of regulatory strategies and instruments. Generally speaking, digital technology has implosive effects due to the simple fact that IT is universal in nature and can be used to process and communicate information of any kind as long as it can be reduced to ones and zeroes.

The *penetration* element signifies the spread of IT to all areas of activity in society. The "calculating machines" of the late 1940s and 1950s were regarded mainly as devices for number crunching. Today the true nature of the technology has become apparent, viz. that it is a multipurpose device. There is also much talk about "ubiquitous computing" and the like. Suffice it to mention one example: a piece of clothing may be tagged with a microchip that transmits data to indicate and track its movements in a store house, in an office, and so forth.

Finally, *sensation* is perhaps the most difficult of the six elements to grasp. It has to do with the ways in which various information processing tools interact with human sensing, experiencing and thinking. The tools are of many kinds: notational systems, books, maps, calendars, speedometers, microscopes, eyeglasses, television, electronic computing devices, and so forth.

Marshall McLuhan in "Understanding Media" attempted to describe, among other things, the characteristics of different media in terms of "hot" and "cold" depending upon such factors as the intensity of the communication and the degree of involvement of the participants.[4] In this way, McLuhan contributed to making people aware that media as such are not neutral, that they affect our behaviour, our expectations, our experiencing, and so forth.

Modern cognitive science also studies the relationships between mind, body, and various tools for information processing. It emphasises interaction and interdependencies. Briefly, human beings think and sense not only with their brain and body but also with their tools.[5] One looks in vain for a clear dividing line between the "inside" and the "outside" of man's mind. As for information technology, we are only beginning to understand the consequences. And a legal understanding hardly exists. One may look for its first signs in themes such as 'trusted systems', 'protection of minors', 'universal information services', and 'digital divide'. Also the discussion of the future development of the legal profession contains elements of interest.[6]

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4 McLuhan, Marshall, *Understanding Media: The Extensions of Man*, Signet Books/The American Library , New York 1964.

5 *See* for example Hutchins, Edwin, *Cognition in the Wild*, The MIT Press, Cambridge 1995.

6 *See* for an example Susskind, Richard, *The Future of Law, Facing the Challenges of*

The above comments on rules and tools indicate that the interaction perspective seeks to establish *a basic, theoretical framework* for the development of legal informatics. They also aim to clarify why concepts and definitions are so often in the foreground in scholarly treatments of legal informatics and why the examination of concepts and definitions must often be concerned with both rules and tools, sometimes in complex ways (consider, for example, concepts such as 'e-money' and 'electronic documents'). Finally, the interaction perspective fosters a legally oriented interest in the infrastructure of society's information processing. In this sense it may be seen as a general theory of law focusing on issues such as media convergence, power relations based on information processing, and legal steering of the information society.

4   Elements of a General Methodology

According to the view taken here, the interaction perspective constitutes the cornerstone of legal informatics. Its general meaning has been outlined above and it remains to look at some of the elements of such a general methodology.

4.1   The Description Problem

The development of IT in society tends to bring about new situations and create needs for revision of legal regulation and, sometimes, design of new legal solutions. One recurring problem, that has been alluded to already, has to do with the development of terminology and concepts. The task is far from trivial and may be seen as one element of a general methodology of legal informatics. In a monograph by Mads Bryde Andersen it has been paid special attention and named "the description problem", a term that has stayed on in Nordic legal informatics.[7]

At least four tasks are involved:

- Adjusting, developing and bringing close legal and technical concepts.
- Describing the IT environment in legally relevant ways.
- Investigation of overall frameworks and wholes.
- Shaping of legal regulation according to the principle of 'viable steering models'.

The task of adjusting etc. can mean many different things. One example is the detailed investigation and critical appraisal of all kinds of formal, legal requirements that may hinder electronic communication between public authorities and between public authorities and citizens.[8] Similar exercises have

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Information Technology, Clarendon Press, Oxford 1996.

[7]   Andersen, Mads B., *EDB og ansvar. Studier i edb-erstatningsrettens beskrivelses-problematik,* Jurist- og Økonomforbundets forlag, Copenhagen 1988.

[8]   A survey of this kind has recently been carried out by the Swedish state ministries under the coordination of a special working group. *See Ds 2003*:29, Ministry of Finance 2003. The

been carried out with regard to legal and technical terminologies pertaining to security with a view to bridging semantic gaps and integrating the two.[9]

The description of IT in legally relevant ways may aim at improved legal understanding in general but also at preparing the ground for legal action of one kind or another. Some examples of different nature are the phenomena of convergence, file sharing, and data mining.[10]

Investigation of overall frameworks and wholes can also best be illustrated with an example. The project SAITS is a multidisciplinary Swedish study of the protection of individual privacy in a changing information environment. The aim is to bring about a better, integrated understanding of threats, interests, possible perspectives, expected technology developments, possible legal solutions etc. The participants in the project represent legal informatics, professional journalism, computer and information science, and mathematically oriented security theory. Themes that are studied include different perceptions of privacy, regulatory models, user modelling, personalization and adaptive interaction, context-aware computing, interaction with mobile devices, issues of trust etc. [11]

The notion of 'viable steering models' is based on the proposition that *legal norms may be viewed as steering models of reality*.[12] Compared with other models of reality (everyday models of the kind that each of us puts together and special, professional models such as economic models), legal steering models are characterised by the traditions and tasks of the legal system. Among other things this means that legal norms are compacted views of reality expressed in verbal descriptions that are made up of a mixture of special legal language, everyday language, and context dependent language such as technical language. That steering models need to be *viable* means that they should be efficient for their purpose. Thus, to the extent that they concern IT and IT-based information systems they should be based on a correct understanding of technology, secure a desired degree of neutrality in relation to different technologies, and be adaptable to new developments of technology. In this way, the principle of viable steering models constitutes a part of the description problem.

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survey has scrutinised a large number of concepts such as 'signature', 'writing', 'notification' etc.

9 One example is Pöysti, Tuomas, *Information Security Commentary* for the ENLIST project, "www.ulapland.fi/home/oiffi/enlist/commentary/information_security.html".

10 Convergence (integration) has been dealt with above. File sharing ('peer-to-peer' systems) has also been touched upon above and is of particular interest in relation to copyright. Data mining, finally, involves automated analyses of all kinds of bulk data (customer data, e-mail, traffic data etc.). It is of interest in connection with, for example, privacy protection and evidence ('computer forensics').

11 "www.sics.se/~olleo/SAITS/". The SAITS project is a collaboration between The Swedish Institute of Computers Science and the Swedish Law and Informatics Research Institute (IRI), Stockholm University.

12 Seipel, Peter, *Computing Law. Perspectives on a New Legal Discipline*, Liber 1977, Stockholm, p. 203-205.

4.2   Legal System Management

Legal system management takes an interest in both how legal information systems (such as information retrieval systems) are designed, described and operated and how legal aspects are handled when information systems in general (such as a Customer Relations Management system) are designed, described and operated. The two kinds of interests are not always clearly distinct. Consider for example information systems in public administration in connection with taxation, social benefits, migration etc. A number of comprehensive and detailed studies of such systems in the perspective of legal system management have been published and have demonstrated both practical and theoretical needs for continued attention.[13] Special branches of legal system management are associated with document management systems, archiving systems, and electronic commerce, for example.[14]

4.3   Legal Futurology

The general theory of legal informatics has for a long time been aware that IT-based information handling in society tends to shift attention from reaction *ex post* to measures *ex ante*. The basic reason is that it is as rule a costly and burdensome undertaking to change and adjust information systems once they have become operational. In consequence, it is better to attend to legal requirements etc. when systems are designed.

   On a higher level a similar strategy is motivated, i.e. there are good reasons to strive to foresee developments of IT and its various applications and to discuss regulatory solutions in advance. The catchword for such endeavours today is 'proactive law'. In the work of the Swedish Government's Information Technology Commission the term *lex ponderanda* was used, indicating that the traditional legal perspectives 'lex lata' (valid law) and *lex ferenda* (the law that ought to be) could usefully be complemented with a third perspective, characterised as *legal futurology*. The IT law observatory of the Commission published various studies of this kind both on a general level (such as the politico-legal framework of IT) and in specific areas (agent technology, for example).[15]

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[13] Two Scandinavian examples are: Magnusson Sjöberg, Cecilia, *Rättsautomation. Särskilt om statsförvaltningens automatisering*, Norstedts Juridik AB, Stockholm 1992. Schartum, Dag Wiese, *Rettssikkerhet og systemutvikling i offentlig forvaltning*, Universitetsforlaget, Oslo 1993.

[14] Two examples may suffice, viz Wahlgren, Peter, *The Quest for Law. Law Libraries and Legal Information Management of the Future*, Jure AB, Stockholm 1999., Nabil A. Adam et al., *Electronic Commerce. Technical, Business, and Legal Issues*, Upper Saddle River, Prentice Hall PTR 1999.

[15] *Law and Information Technology. Swedish Views*, Ed. Seipel, Peter, Fritzes, Stockholm 2003 (SOU 2002:112), p. 14-17.

4.4   *Legal Steering*

As commented on above, legal norms may be seen as a part of the system of legal steering of society. This leads to those roots of legal informatics that are associated with cybernetics, the art of steering. Today cybernetics is no longer a term in frequent use although parts of the perspectives associated with cybernetics continue to attract attention. One example is the general theory of lawmaking, which has clear connections to legal informatics, not least as far as information aspects of steering are concerned. Generally speaking, the interests in pro-active law and in legal system management may very well lead to a revival of the early, broad discussions of the tasks of legal steering in the perspective of information technology. Cybernetics reborn.

4.5   *Didactics*

The place of legal informatics in law school curricula varies considerably. The model proposed by the Council of Europe in 1992 comprises elements of both rules and tools and a perspective that integrates the two.[16] The model can be found in fragments, usually in the form of courses in 'computer law' (general or special), but only more rarely in its totality and as a mandatory part of legal studies. One reason is that not all law schools have developed sufficient expertise to be able to offer advanced courses in legal informatics based on the interaction perspective proposed in this paper. Moreover, any new subject must struggle to obtain resources and curricular space. To put it mildly, newcomers are not favoured. Nevertheless, progress has been made as witnessed by, for example, the growing number of master programmes in various branches of legal informatics and initiatives such as the series of international, bi-annual conferences on *Substantive Technology in Law School and Law Practice* and *the European Network for Legal Information Study and Training*.[17]

4.6   *The Theory of Particular Fields*

An enumeration of all the possible fields and sub-fields of legal informatics that offer possibilities of theory building would be long. The protection of personal data offers a good example. Already the basic issue 'what are the protected interests?' has generated a host of more or less original thinking. From the previously mentioned SAITS project mention may be made of sub-fields such as

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[16] *Teaching, research and training in the field of law and information technology.* Recommendation no. R (92) 15 adopted by the Committee of Ministers of the Council of Europe on 19 October 1992 and explanatory memorandum. In the appended suggested elements of a study programme the General outline begins in the following way: "A presentation of information technology as it is related to law, in particular the interaction of law and information technology reflected in, for example, needs for new legal concepts, standards, procedures, law-making strategies and system design and planning."

[17] "www.subtech2004.org/subtech2004/subtechoverview/" and "http://itlaw.law.strath.ac.uk/ ENLIST/".

studies of system design processes in the perspective of data protection and the consequences of information overload for the threats to individual privacy.[18] In a broad perspective, limited theory building of this kind will also step by step lead to a clearer understanding of the overall paradigms of legal informatics. The road has certainly not reached its end.

4.7   Adjacent Fields

Just as theory building in particular fields and sub-fields of legal informatics unfolds into a multitude of possibilities and perspectives, so do the links to adjacent fields. Sometimes it is a question of importing knowledge, sometimes of cross-fertilisation, sometimes of joint efforts, and so forth. The neighbouring fields range from hardware-oriented computer science to "soft" information sciences oriented towards human thought and relations. The interests pursued may concern all kinds of subjects – information security, intelligent data networks and the semantic web, computer programming, and so on.

5   Keeping up

A frequently asked question is whether law in general and legal informatics in particular have managed to keep up with the rapid development of IT and its uses in society. Two ideologies seem to exist. According to one of them, law should not lead and harm will be done if lawmakers and courts step in too early and attempt to shape the information society. So much has proved to be not foreseeable and freedom for the various players creates the best conditions for growth.

The other ideology supports a strive not to lag behind and even argues for law being in the forefront. Where the future is not yet known, prognostication should be attempted. And the dangers associated with, for example, the digital divide, the erosion of privacy protection, and the creation of information monopolies, motivate that legal solutions are worked out and applied before the threatening, undesired effects have materialised.

A closer look soon makes it clear, that the two ideologies are not mutually exclusive and that the preconditions for applying them vary from one framework to another. For one thing, rule and tool aspects may offer different arguments and the wait and see strategy appears to be motivated above all with regard to rash regulatory action. Mistakes and misjudgements are not difficult to find. For example, the first Swedish data protection legislation in 1973 was based on the presumption that the Swedish Data Act was to regulate a couple of hundreds of personal data files (already at that time there were thousands). The data protection directive of the European Union (95/46/EC) failed to foresee that its elaborate system of restrictions and barriers was to be applied to all kinds of more or less innocent processing of personal data dispersed in electronic texts,

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18 "www.sics.se/privacy/wholes2004/pgm.html".

which pose different problems than traditional files and databases.[19] The Swedish Electronic Signature Act of 2000 has proved not to correspond to practical demands and remains mainly a paper construction. And so on.

Two conclusions may be proposed. One is that there is a risk of trailing behind as well as of causing harm by misinterpreting the future. The other is that precisely these difficulties make it an urgent task for legal informatics to be future-oriented and to assist in the practical task of keeping up, i.e. adapting law and legal thinking to the changes brought about by information technology in society.

6   Attempt at a Bird's Eye View

6.1   Legal Informatics

The development of legal informatics has been going on for more than half a century. Already in the late 1970s the field had a history that could be divided into different periods: the period of forerunners until about 1960, the period of growth during the 1960s and the period of maturing during the 1970s.[20] The forerunners were disparate attempts to discuss computer-related aspects of law such as Lee Loevinger's vision of legal thinking based on quantitative and formal reasoning in 1949 and Norbert Wiener's reflections on cybernetics and law in 1954.[21] During the 1960s the literature in the field grew and comprised both works on the emerging concept of 'computer law' and analyses of computer assisted legal decision-making and automated information retrieval.[22] This development continued during the 1970s and was accompanied by a number of attempts to understand the broader context and explain the notion of legal informatics.[23] Special research institutes oriented towards legal informatics began to appear by the end of the 1960s and the early 1970s.[24]

After these formative years various approaches have been tried. The efforts can be described according to the following, simple scheme (Table A):

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[19] A Swedish legislative committee has proposed that the Personal Data Act of 1998 (which follows the directive closely) should be amended to reflect this difference. *Översyn av personuppgiftslagen, SOU 2004:6*, Fritzes, Stockholm 2004.

[20] Seipel, Peter, *Computing Law. Perspectives on a New Legal Discipline*, Liber, Stockholm 1977, p. 112-116.

[21] Loevinger, Lee, *Jurimetrics the Next Step Forward*. Minnesota Law Review, 33/1949. Wiener, Norbert, *The Human Use of Human Beings. Cybernetics and Society*, Eyre & Spottiswoode, London 1954.

[22] *See*, for example, Duggan, Michael A., *Law and the Computer. A KWIC Bibliography*, Macmillan Information, New York 1973.

[23] One example may stand for the rest: Reisinger, Leo, *Rechtsinformatik*, de Gruyter, Berlin 1977.

[24] The Swedish Law and Informatics Research Institute began its work in 1968, then named The Working Party for EDP and Law.

Computer Law: Practical / Integration	Grand Theory: Theoretical / Integration
Traditionalist: Practical / Separation	Information * 2: Theoretical / Separation

Table A

The lower left square is where legal informatics is more or less a non-entity. Issues of rules and tools are kept apart and no need is seen for expanding and complementing legal thinking. Computer-related problems may be studied but then within the familiar framework of traditional legal categories and concepts. The traditionalist view emphasises continuity and the maxim that nothing is new under the legal sun.

In the upper left square focus is on computer law, which is regarded as a field with special characteristics and in need of co-ordinated study. But the needs perceived are practical in nature and the field of study is delimited and structured accordingly. There is a rich body of literature with this orientation, most of it with titles that are variations of 'Computer Law' and 'Internet Law'.

The 'Information times 2' perspective in the lower right square takes an interest in the interplay of rules and tools as outlined above. It seeks to develop a coherent notion of *information law* with particular emphasis on the soft sides of information technology. It also encompasses issues of legal usage of information technology – "pure legal IT applications" – but these issues seen as separate and treated apart from the information law issues.

The 'grand theory', finally, in the upper right square can be described as the most ambitious effort to bring together elements of the rule and tool perspectives into an integrated whole. In particular, the 'grand theory' considers it useful to apply perspectives that do away with strict dividing lines between legal regulation of the use of IT and legal uses of IT. One way of accomplishing this is to define problem areas in such a way that they are not limited to one field or the other. An example is the early work on "Administration through machines" by Hans Peter Bull published in 1964.[25] Another example of more recent date is Lawrence Lessig's discussion of how the shape of information processing systems interplays with legal regulation.[26]

The scheme above is, of course, too simple to reflect the multitude of approaches to legal informatics themes. Works may contain mixes of elements of all four categories and, thus, may be perceived differently by different

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[25] Bull, Hans Peter, *Verwaltung durch Maschinen. Rechtsprobleme der Technisierung der Verwaltung*, Grote, Köln/Berlin 1964.

[26] Lessig, Lawrence, *Code and Other Laws of Cyberspace*, Basic Books, New York 1999.

observers. Also many scholars in the field of legal informatics work in different sub-fields over time and very often specialise in one or a few sub-fields (just as scholars do in other branches of legal science). In fact, this is necessary since legal informatics as a whole has by now become so comprehensive and complex that it is difficult, even impossible, to build up and maintain complete expertise. Briefly, it takes time and effort to move from one sub-field to another. But, generally speaking, experts tend to slide into one of the four broad categories according to the scheme.

It could be said that the four table cells represent some kind of progression: from the traditionalist view via the computer law and the information times 2 views to the grand theory view. But this would be misleading, not least since legal informatics is being developed in all four table cells and not only in the theoretical/integration cell. But, of course, the practical/separation cell does not hold much future for legal informatics as such. If this cell dominates at the expense of the other three cells, legal informatics will, eventually, dwindle away.

6.2   IT Law

IT law may be broken up and pursued as intellectual property law, as administrative law, as procedural law, as constitutional law, as insurance law, as criminal law, and so forth. Such splitting up can be motivated by referring to a principle that IT-related issues ought to be treated in their particular, legal context and not singled out for isolated analysis merely because they happen to concern a certain technical medium. This argument is certainly sound. But if we examine it a bit more closely we arrive at the question 'what is a particular, legal context?' It may be an established branch of law such as the ones just mentioned. But 'a particular legal context' may also be something else according to, for example, the following scheme (Table B below):

The handbook approach in the lower left square means that practical needs lead to a treatment of different regulatory aspects of IT together. Examples abound and can presently be found in many textbooks on "computer contracts" and the like. The typical work of this kind treats one or a few main fields of law without going into problems associated with dividing lines and cross boundary problems. Such studies are useful in the 'how-to-do-it' sense and require substantial efforts if their ambition is to cover large portions of the field of IT law.

The problem cluster approach	The general theory approach
The handbook approach	The special theory approach

Table B

The problem cluster approach differs from the handbook approach in that its point of view is problem-oriented and concerned with legal aspects of a particular issue, striving or situation. One example may be 'protection of children on the internet', another 'trust in connection with electronic commerce'. Such approaches necessitate analyses of different legal instruments for solving the problems and how these instruments are interrelated. In this way the problem cluster approach is more 'functional' in nature than the handbook approach. It is also not uncommon that it is critical and interested in locating lacunae and deficiencies in existing legal regulation.

The special theory approach distances itself from the problem cluster approach mainly by taking a stronger interest in the concepts and the logic of IT law. Its themes typically require analyses of the interaction of rules and tools as discussed above and it does not content itself with simple presentations of valid law (lex lata). Examples of studies of this kind would be 'the legal nature of autonomous electronic agents', 'internet governance', and 'electronic document management'.

Finally, the general theory approach may be described as an extension of the previous one but directly concerned with developing the notion of IT law in terms of its basis, structure, special characteristics, and place within legal informatics.

Two observations are in order. The first is a note that the two classification schemes in Table A and Table B are clearly interrelated. Actually, Table B can be seen as a re-formulation of Table A. The second observation is a reminder of the obviously hazy dividing lines between the four approaches to IT law. This has already been commented on with regard to Table A and need not be further detailed here.

7   Conclusions

So, then, what conclusions are there to be drawn from this general discussion of legal informatics, the interaction perspective ('rules and tools'), and the notion of IT law? One is, I believe, that it would be mistaken to stay within the confines of fragmented and narrow studies of IT-related regulatory issues, studies that do

not attempt to discern general problems, interdependencies, special complications, possible use of knowledge from related fields, and so forth.

The second conclusion is that different approaches – from 'classic law' to 'cyber law' – do not exclude one another. Quite on the contrary, they should be seen as complementary and mutually supportive. For example, a study of 'informed consent' in the context of personal data protection does not lose interest merely because it is more concerned with a traditional analysis of different forms of consenting than with the changing nature of personal data protection at large due to the technical phenomena of integration and penetration (cf. above).

Finally, legal informatics provides a fertile ground for the continued development of IT law. In a word, legal informatics opens ways of adding to and enriching traditional ways of dealing with IT-related aspects of law. Moreover, the advance of legal informatics itself will benefit from letting the field encompass both regulatory aspects of the use of IT and IT applications in the field of law. As outlined in this paper, the main concern and the pruning principle ought to be the interaction perspective, i.e. the interplay of 'rules' and 'tools'. It is a matter of opinion how far such a strategy can lead. A weak interpretation probably concedes that it will, perhaps, add a few bits and pieces of knowledge to our understanding of IT law. A strong interpretation makes room for the hypothesis that IT changes the information infrastructure of society fundamentally and that the changes will deeply affect the legal system. Thus, according to the strong interpretation it would be a major mistake to exclude matters of IT law from legal informatics. It would mean not to take on its perhaps greatest challenge. The next twenty to thirty years will make it clear which interpretation comes closest to the truth.